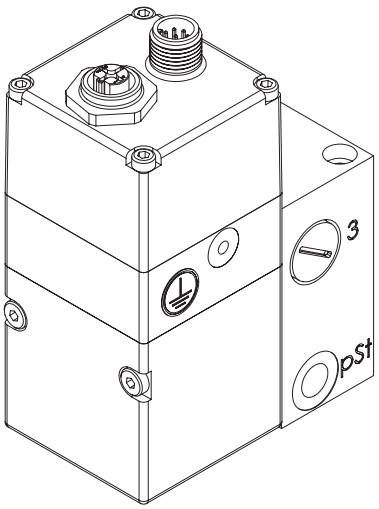
LASGAR BASIC

Flexible and modular Piezo gas regulation system for laser cutting machines with low and medium laser power

Technical data

EN MET

HOERBIGER
because performance counts



CUTTING GAS REGULATION IS ONE OF THE KEY FACTORS FOR OUTSTANDING CUTTING RESULTS AND MACHINE PRODUCTIVITY. WE AT HOERBIGER CAN HELP YOU OPTIMIZE YOUR ENTIRE GAS SUPPLY AND OFFER YOU SOPHISTICATED CUTTING GAS SOLUTIONS IN ORDER TO ACHIEVE THE BEST CUTTING PERFORMANCE WITH YOUR MACHINE.

MICHAEL MACK, GLOBAL PRODUCT MANAGER PIEZO TECHNOLOGY

LASGAR BASIC

Flexible and modular Piezo gas regulation system for laser cutting machines with low and medium laser power

Economical, high-performance, and modular cutting gas regulation system with low weight, optimized for low- and medium-power laser cutting machines.

Thanks to Piezo technology, the regulating system offers outstanding pressure stability and control speed in the lower pressure range starting at 0.1 bar. In addition, the geometry was optimized for a high flow rate, which guarantees a safe blowing out of the melted material even with thicker sheets. This way, you can achieve an even better cutting quality while simultaneously increasing performance.

The system can be combined at will as a stand-alone device or as component with gas selection valves. There are analog and digital communication interfaces available. A large toolbox of accessories and innovative software allow individual configuration. Thus, even challenging installations and retrofittings of existing gas regulation systems to LasGAR basic are possible without problems.

For 30 years, the proven HOERBIGER Piezo technology has made the small but crucial difference when it comes to regulation quality and speed.

YOUR BENEFITS AT A GLANCE

▪ SAVE TIME AND MONEY	▪ LasGAR cutting gas regulators are very compact systems with reduced interfaces. Therefore, they are easy to install and integrate. With a minimum of work for piping, cabling, and machine programming.
▪ INCREASE THE SPEED OF YOUR MACHINE	▪ The regulators are optimized for the minimum possible weight and tested for acceleration with weights of up to 20 g. At the same time, the regulator offers extremely fast gas and pressure change times in every situation. You can further optimize your cutting and machine parameters in order to achieve the maximum dynamic in your machine and thus increase machine productivity.
▪ IMPROVE YOUR CUTTING QUALITY	▪ LasGAR cutting gas controllers have been optimized for the best low-pressure stability, the highest flow rate, and the lowest hysteresis. As a result, you can achieve smoother cutting surfaces and less burr formation, while reducing your gas consumption thanks to lower input pressure. Moreover, you can cut thicker sheets or simply cut faster than previously. This also reduces the reworking required for the lasered parts.
▪ REMAIN FLEXIBLE	▪ The LasGAR toolbox system is very flexible and can be adapted to your individual situation and converted or expanded at any time.
▪ MAKE THE CONDITION OF YOUR GAS REGULATION VISIBLE AND SMART	▪ The whole LasGAR family is also available with the SMART option. Via a Bluetooth connection, you receive information about the device condition, the remaining service life, and important performance data in real time via the associated app.
▪ ENJOY FULL SERVICE & SUPPORT	▪ Our global partner network and our core team in Altenstadt guarantee you excellent service and support in every case – regardless of whether you want to optimize the gas flow, repair, or service. Just contact us and let us know which of our service packages will fit you the best!

GENERAL PROPERTIES

LasGAR basic

GENERAL PROPERTIES

LASGAR BASIC

Type	LGRB0	LGRB1	LGRB2	LGRB3	LGRBF2	LGRBF3
Fastening type	Flange, 2 x through bore for M4	Bolts, 2 x through bore for M4	Flange, 3 x through bore for M6			
Installation position	Any					
Connection sizes						
Pneumatic connection type	Flange[1]	Threads				
Cutting gas inputs	DN6	G 3/8				
Cutting gas outputs	DN6	G 1/4				
Control air input	DN2	G1/8	M 5			

Weight	0.5 kg[1]	1.45 kg	1.85 kg	2.0 kg	3.75 kg	3.9 kg
Protection type	IP 50 (DIN EN 60529 A1:2000)					
Storage temperature	-20 °C to +70 °C					
Ambient temperature	-5 °C to +45 °C					
Medium temperature	-10 °C to +50 °C					
Rel. Humidity	5 % to 95 % (non-condensing)					
Material						
Housing	Al anodized					
Internal parts in contact with media	Al coated, PA-GF, CuZn, stainless steel					
Seals	FKM, NBR					

Behavior in case of electrical or pneumatic energy failure	Cutting gas output not defined	Close cutting gas inputs, cutting gas output not defined
Max. permissible accelerations		
Positioning	30 m/s² (vector sum)	
Cutting (x/y axis)	20 m/s² (vector sum)	
Shock	30 m/s²	

Conformity	CE, RoHS 2011/65/EU
Other checks	EMC (ECC), BAM

[1] optional with adapter plate (+0.2 kg)

ELECTRICAL PROPERTIES

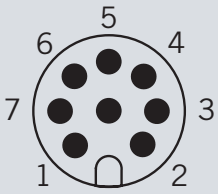
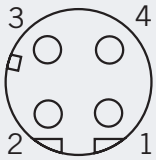
LasGAR basic

ELECTRICAL PROPERTIES		
	LASGAR BASIC ANALOG	LASGAR BASIC DIGITAL
Electromagnetic compatibility (EMC)		
Immunity to interference	EN 61000-6-2	
Emitted interference	EN 61000-6-4	
Electrical connection, proportional valve	1x M12 A-coded 8-pin male	1x M12 A-coded 8-pin male 1x M12 D-coded 4-pin female
Electrical connection, upstream valve	1-3x freely pre-assembled valve plugs	
Nominal voltage (U(Nom))	24 V DC± 15%	
Max. residual ripple	10% (UN)	
Current consumption (I max)	100 mA (only prop.controller)	
Supply		
Nominal power (PN)	2 W (only prop.controller)	
Target value input		
Target value specification (W)	Voltage variant: 0-10 V DC Current variant: 4-20 mA	digital - Ethercat or Profinet
Input resistance (Ri)	Voltage variant: > 60 kOhm Current variant: 250 Ohm	
Resolution (W/p2) [bar]	Voltage variant: 0.5 V/bar Current variant: 0.8 mA/bar	
Actual value output monitoring input pressure p1		
Output voltage/current	Voltage variant: 0-10 V DC Current variant: 4-20 mA / max. 500 Ohm	digital - Ethercat or Profinet
Accuracy	1% Full Scale	
Resolution (X/p2) [bar]	Voltage variant: 0.333 V/bar Current variant: 0.533 mA/bar	
Output current max. (short circuit-proof) (I max)	Voltage variant: 1 mA	
Actual value output monitoring output pressure p2		
Output voltage/current	Voltage variant: 0-10 V DC Current variant: 4-20 mA / max. 500 Ohm	digital - Ethercat or Profinet
Accuracy	1% Full Scale	
Resolution (X/p2) [bar]	Voltage variant: 0.5 V/bar Current variant: 0.8 mA/bar	
Output current max. (short circuit-proof) (I max)	Voltage variant: 1 mA	
Upstream valves gas 1, 2, and 3		
Switching voltage ON (U on)	24 V DC± 10%	
Switching voltage OFF (U off)	0 V	
Nominal power per switching valve	2.5 W	

ELECTRICAL PROPERTIES

LasGAR basic

	LASGAR BASIC ANALOG	LASGAR BASIC DIGITAL
Digital I/Os		
Output voltage (U out)	OFF = 0 VDC ON = U(Nom) – 0.7	
Output current (I out)	≤ 200 mA / short circuit-proof	≤ 100 mA / short circuit-proof

Plug assignment (X1)		1 +24VDC Power 2 Target value 3 GND 4 p1 pressure 5 p2 pressure 6 Ready / pressure reached 7 UART RxD 8 UART TxD	1 +24VDC Power 2 NC 3 GND 4 Out 1 / Gas_1 5 Out 2 / Gas_2 6 Out 3 / Gas_3 7 UART RxD 8 UART TxD
Plug assignment (X2)			1 TD + 2 RD + 3 TD – 4 RD –

PNEUMATIC PROPERTIES

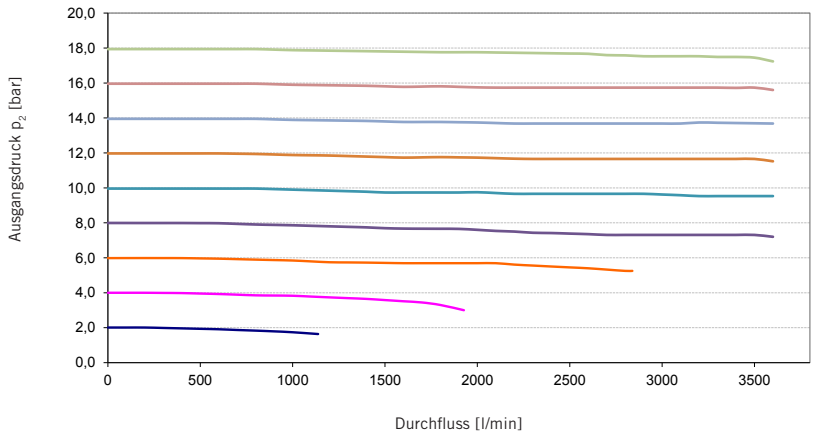
LasGAR basic

PNEUMATIC PROPERTIES	
LASGAR BASIC	
Cutting gases	
Media	Compressed air, oxygen, nitrogen, argon
Quality	according to ISO 8573-1:2010 (3:2:2)
Nominal pressure (PN)	30 bar
Cutting gases input pressure ranges	
All gases min (p1 min)	0 bar
Compressed air max. (p1 max.)	30 bar
Oxygen max. (p1 max.)	20 bar
Nitrogen max. (p1 max.)	30 bar
Argon max. (p1 max.)	30 bar
Cutting gases output pressure ranges	
All gases min (p2 min)	0.1 bar
Compressed air max. (p2 max.)	20 bar
Oxygen max. (p2 max.)	13 bar
Nitrogen max. (p2 max.)	20 bar
Argon max. (p2 max.)	20 bar
Regulation accuracy of output pressure	
Regulation range <10 bar; Ambient temperature 5 to 45 °C	± 0.03 bar
Regulation range <10 bar; Ambient temperature <5 °C	± 0.1 bar
Regulation range >10 bar; Ambient temperature -5 to 45 °C	± 0.2 bar
Pressure stability <10 bar	± 0.01 bar
Pressure stability >10 bar	± 0.02 bar
Repeat accuracy	< 1% / FS
Hysteresis	< 0.5% / FS
Leakage regulator @ Ub = 24 VDC, p1 = 17 bar, set value = 0 bar	< 3 Nl/min
Internal air consumption	< 2 Nl/min
Gas flow rate (Q) (with p1 = 6 bar and p2 = 0 bar)	1200 l/min
Control air	
Medium	Compressed air, nitrogen
Quality	According to ISO 8573-1:2010 (6,3,3)
Input pressure min. (p St min)	4.5 bar
Input pressure max. (p St max)	10 bar
Recommended filter size for cutting gases	10 µm
Filter size for control air (installed)	100 µm

FLOW CURVES
LasGAR basic

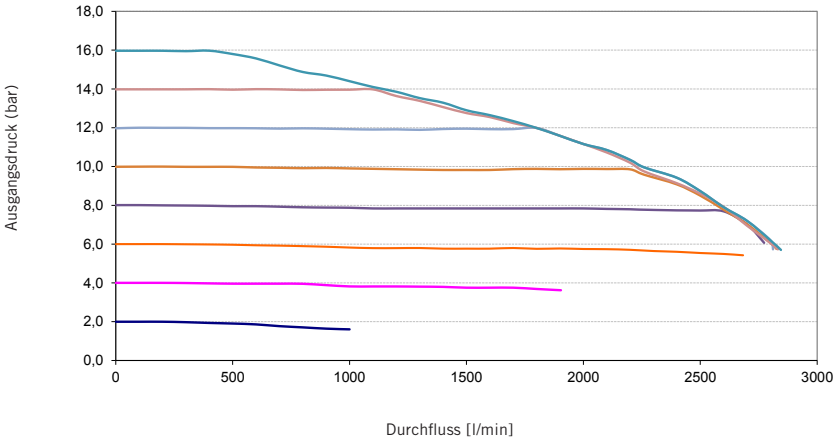
FLOW FROM 1 TO 2, FLOW RATE

Measurement conditions
- Input pressure 25 bar



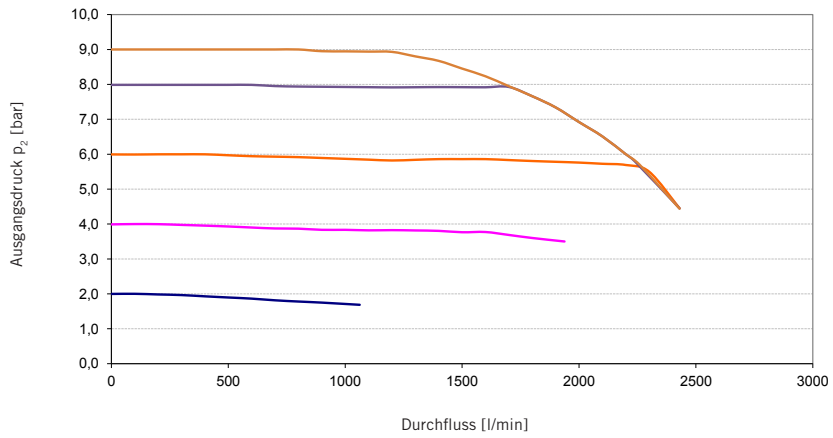
FLOW FROM 1 TO 2, FLOW RATE

Measurement conditions
- Input pressure 17 bar



FLOW FROM 1 TO 2, FLOW RATE

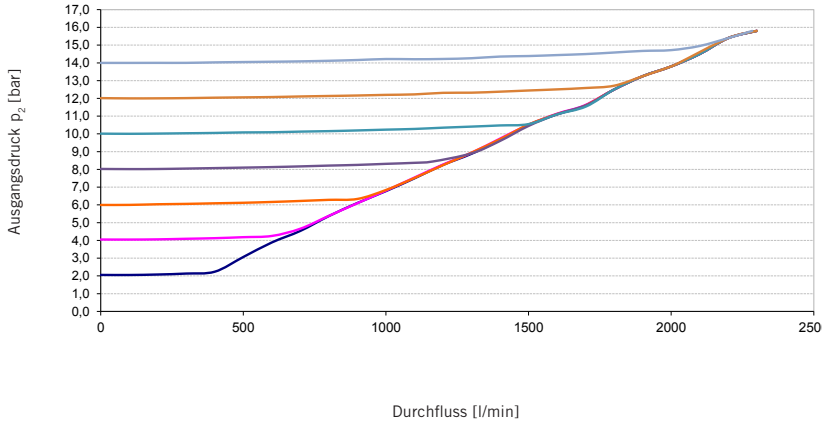
Measurement conditions
- Input pressure 10 bar



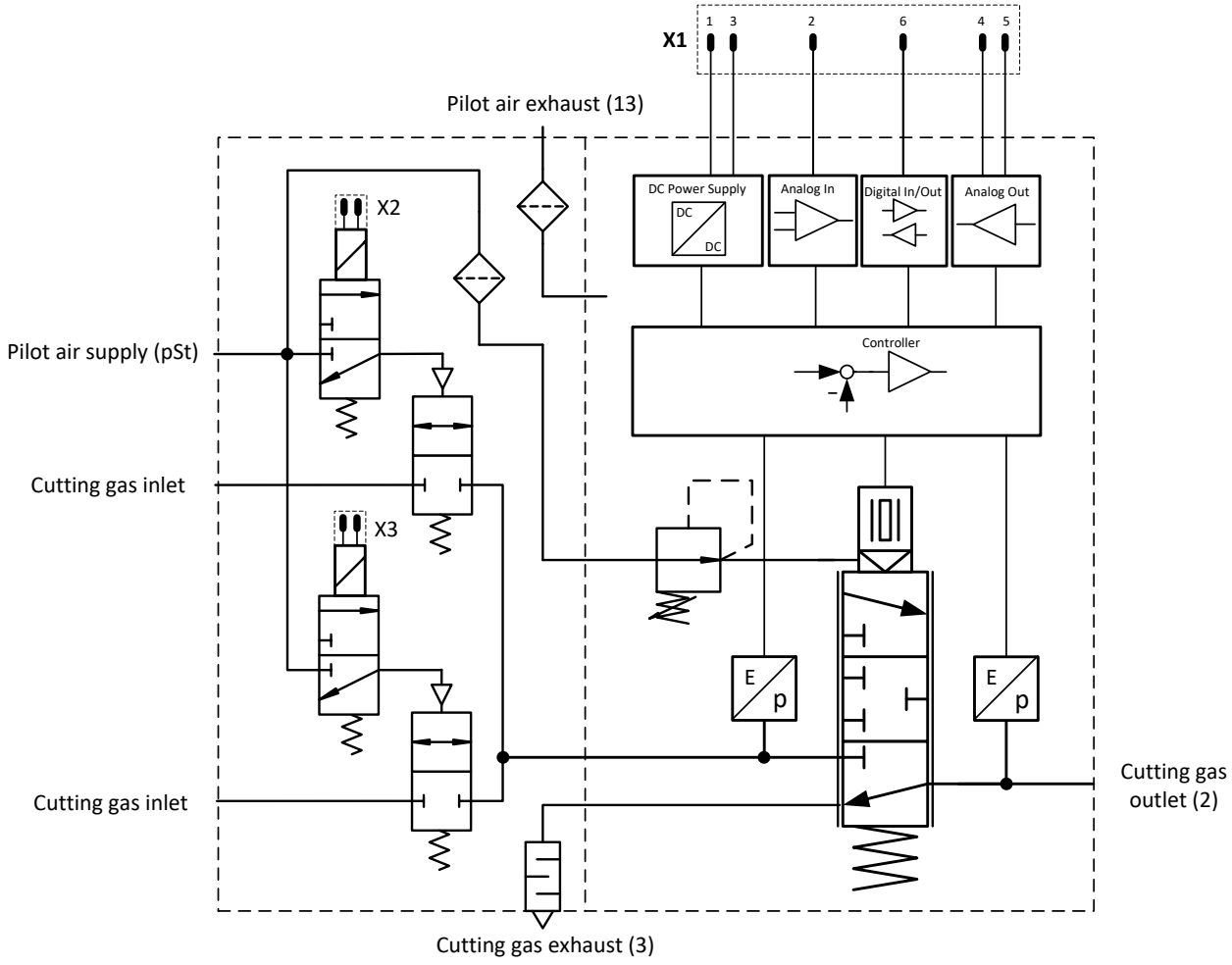
FLOW FROM 2 TO 3, EXHAUST FLOW RATE

Measurement conditions

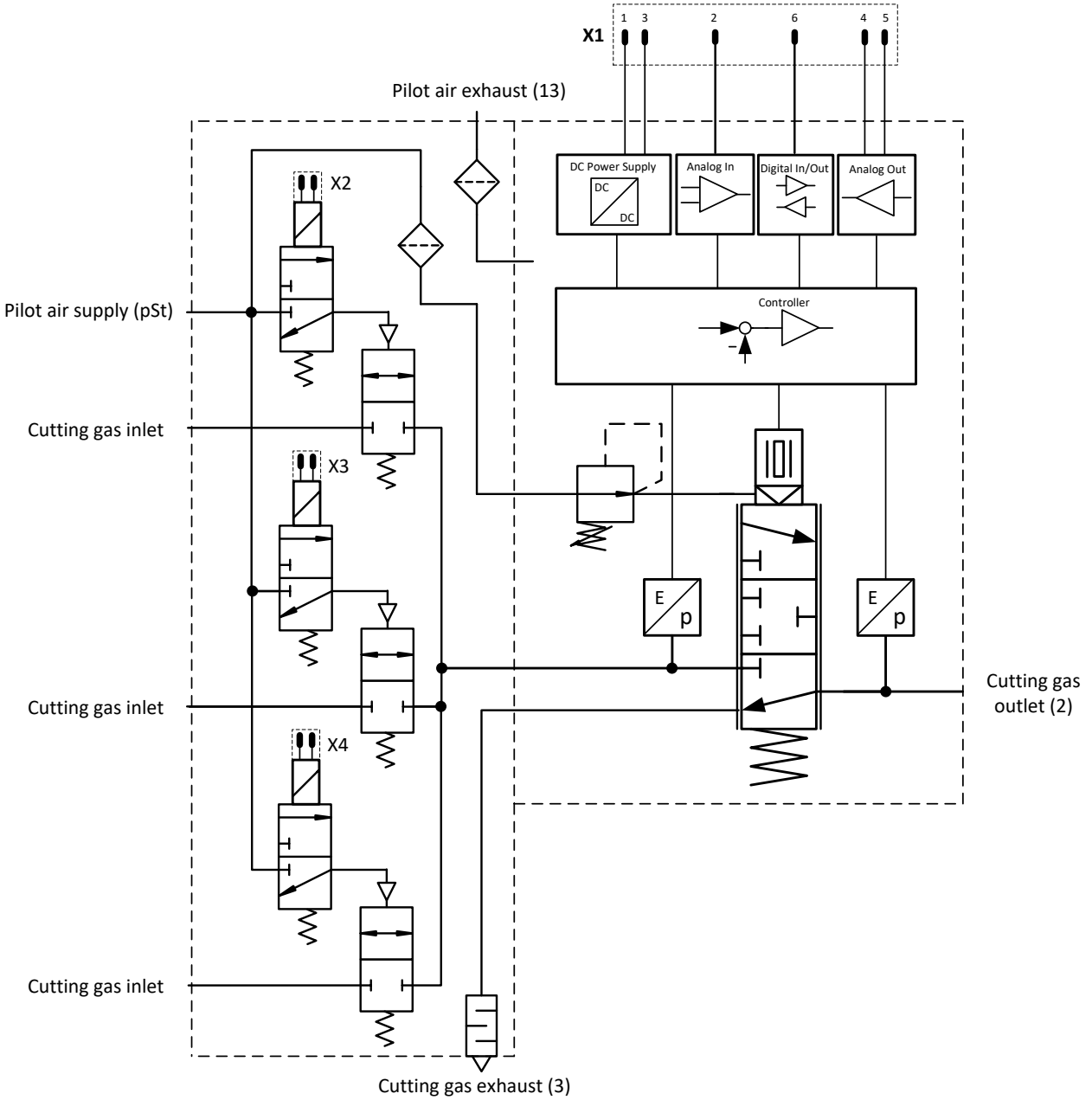
- Input pressure 18 bar



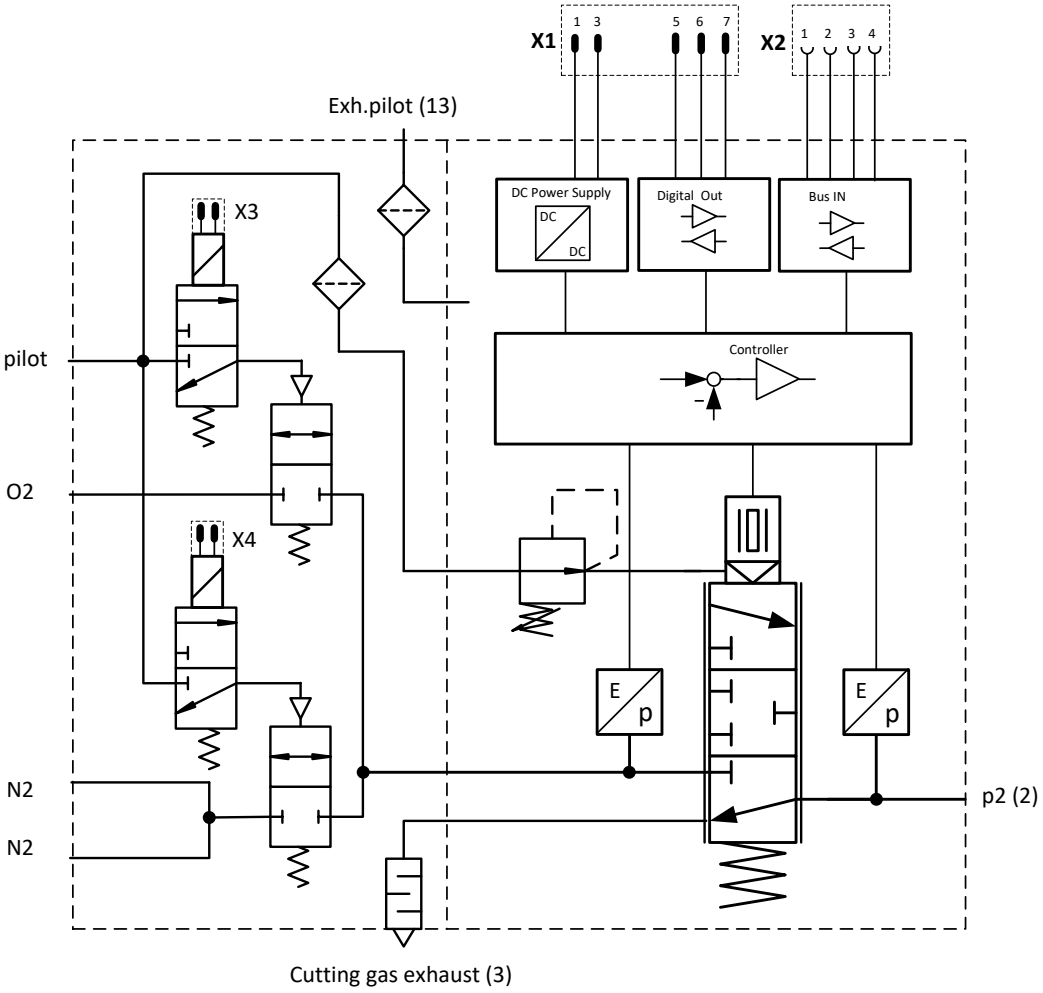
LASGAR BASIC ANALOG WITH 2-GAS CONNECTION



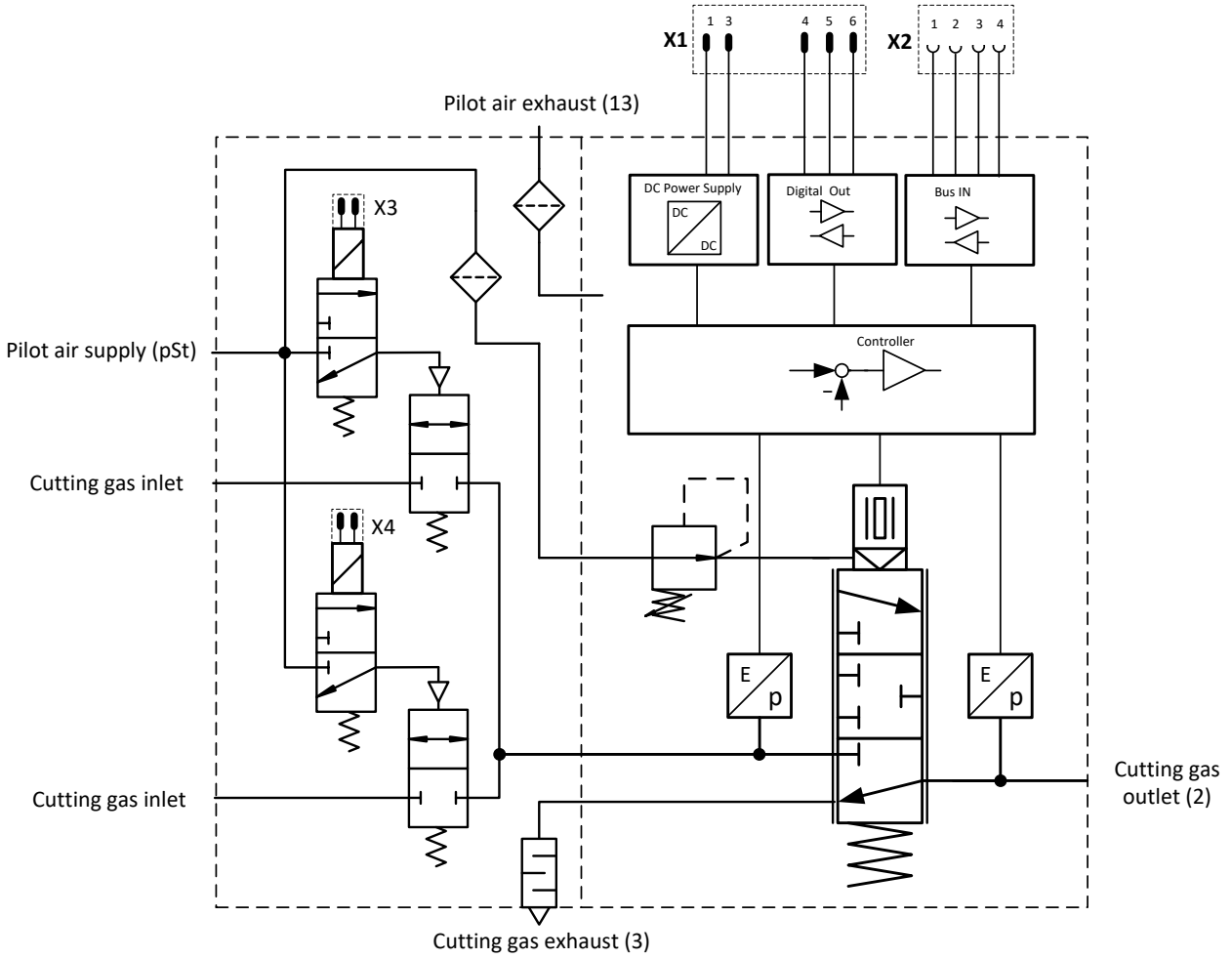
LASGAR BASIC ANALOG WITH 3-GAS CONNECTION



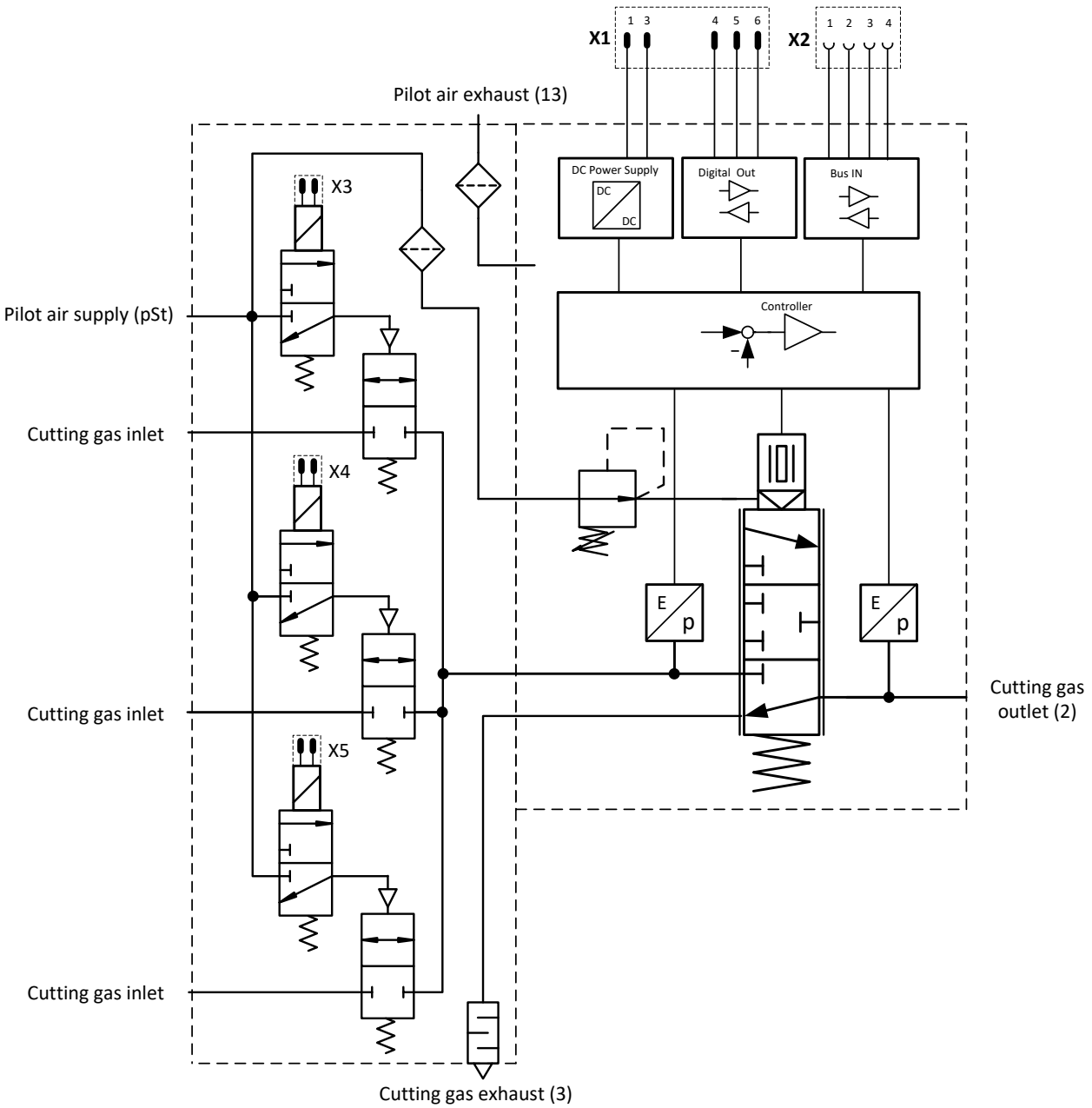
LASGAR BASIC DIGITAL WITH 2-GAS/DOUBLE N2 CONNECTION



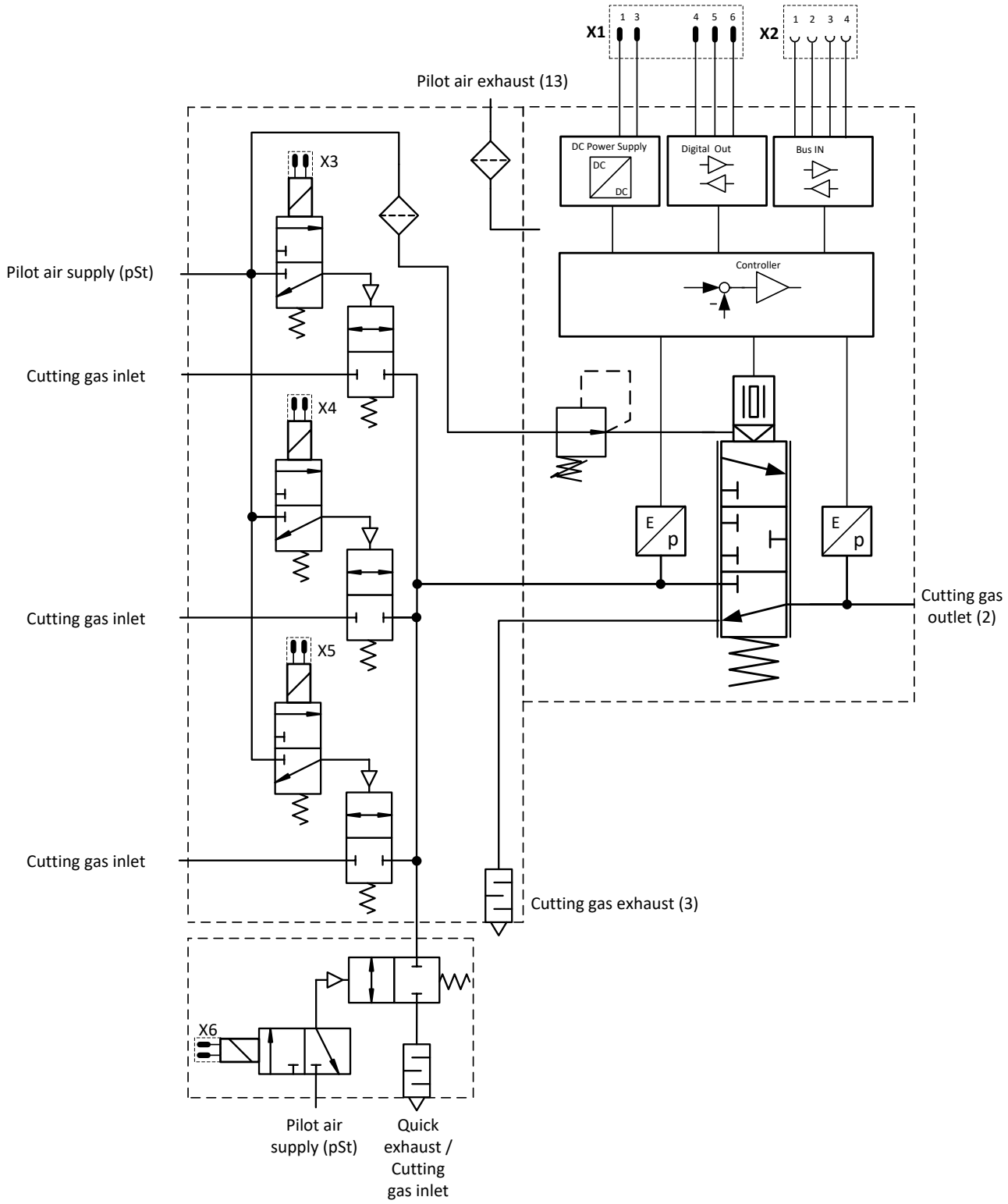
LASGAR BASIC DIGITAL WITH 2-GAS CONNECTION



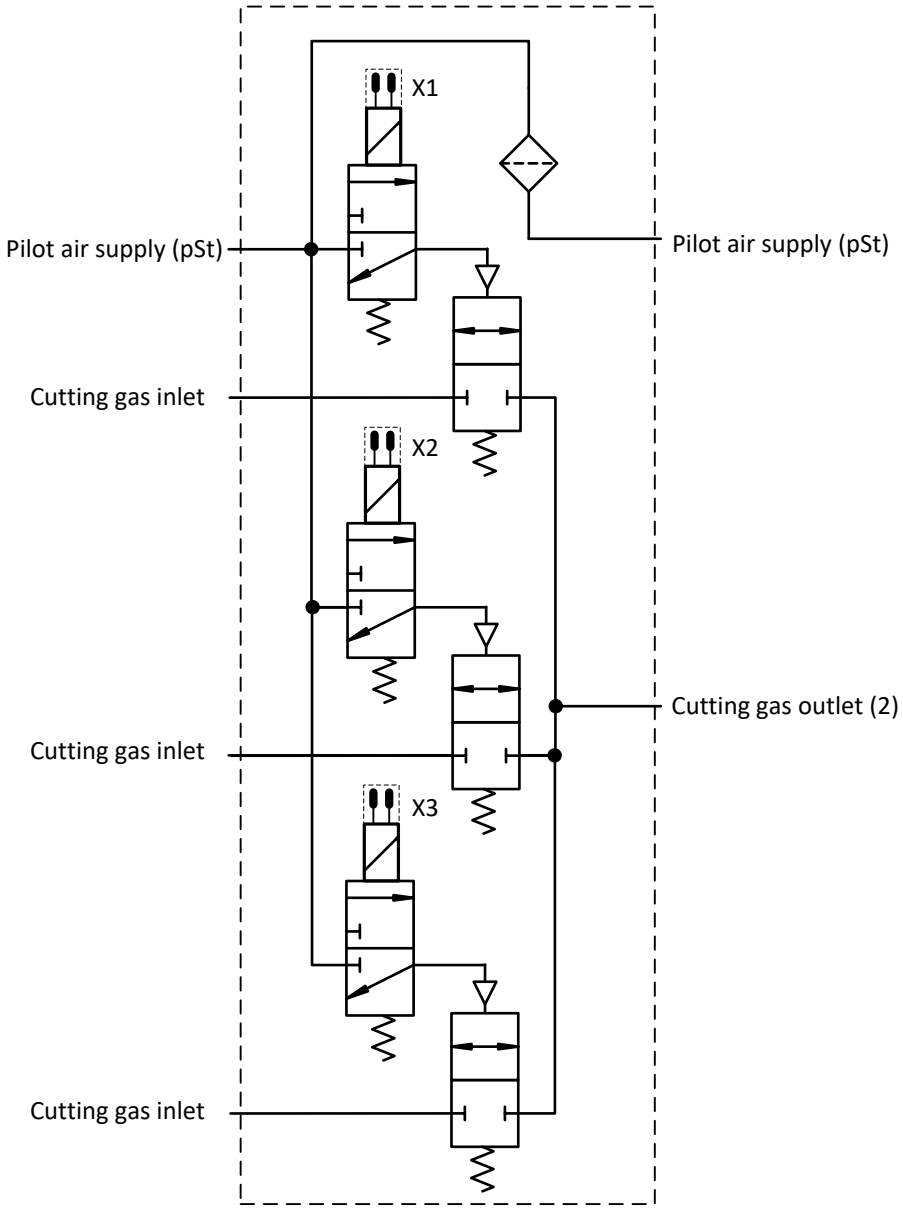
LASGAR BASIC DIGITAL WITH 3-GAS CONNECTION



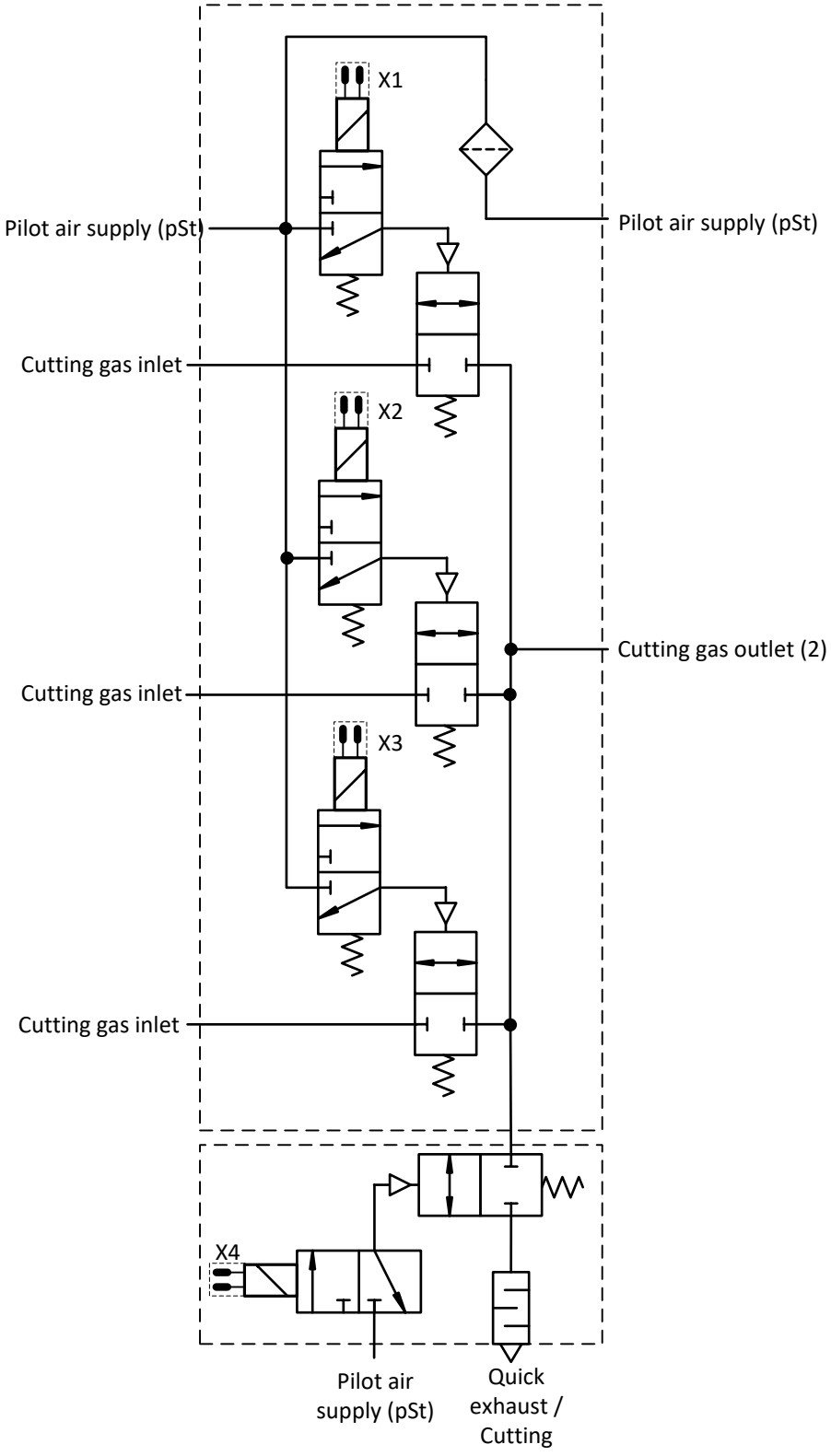
LASGAR BASIC DIGITAL WITH 3-GAS CONNECTION AND QUICK-RELEASE VALVE (QRV)



LASGAR BASIC BLOCK DIAGRAM VALVE BLOCK SPLIT 3-GAS



LASGAR BASIC BLOCK DIAGRAM VALVE BLOCK SPLIT 3-GAS AND QUICK-RELEASE VALVE (QRV)



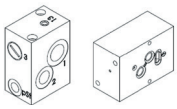
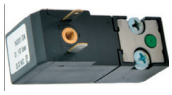
SERVICE AND PROCESS DATA OBJECTS (PDO) ETHERCAT/PROFINET PROCESS

OBJECTS Brief description	FUNCTION	SIZE	VALUE	DESCRIPTION
PR_RE Pressure reached Window [%]	Output	1 Word	Format 0x0000	Display of the currently set upper and lower limit values for 'Pressure reached window [%]'
P_IST Actual value of output pressure		1 Word	0…20000 digits = 0…20,000 mbar	Response 'current output pressure', 0-20 bar
PV_IST Actual value of input pressure		1 Word	0…30000 digits = 0…30,000 mbar	Response 'current input pressure', 0-30 bar
GAS_STA Gas status		1 Word	Bit 0	Response 'pressure reached': Value = 1 = pressure reached Condition: P_IST in the window of PR_RE
			Bit 1	Response 'regulator ready': Value = 1 = ready
			Bit 2	Warning, input pressure low Condition: if 'PV_IST < (110% * P_SOLL)' then 'bit 2 = 1'
			Bit 3	Warning, input pressure too low Condition: if 'PV_IST < (105% * P_SOLL)' then 'bit 3 = 1'
			Bit 4	1=Calibration active 0=Calibration not active
REG_ST Set value of D-regulator		1 Word	0…10000 digits = 0…100%	Internal set value of the Piezo pressure regulation
SER_NR		1 Word	Decimal number	Serial no. of device
SW_VER		1 Word	Hexadecimal number	Software version
DATA_1		1 Word	Reserve	No data content
PAR_SEL		1 Word	Bit 8-15	Display of the selected PID parameter set
DATA_3		1 Word	Reserve	No data content
PR_RE Pressure reached Window [%]	Input	1 Word	Higher byte 0x0000 …. 0xFF00 (0-17%) --- Lower byte 0x000 … 0x00FF (0…17.0%)	Setting of the upper limit value of PR_RE in the range +0…17.0% (default +17%) --- Setting of the lower limit value of PR_RE in the range -0…17.0% (default -17%)
P_SOLL Output pressure target value		1 Word	0…20000 digits = 0…20,000 mbar	Target value specification for output pressure
GAS_SEL Gas selection		1 Word	Bit 0	Switch upstream valve 1 0=OFF / 1=ON
			Bit 1	Switch upstream valve 2 0=OFF / 1=ON
			Bit 2	Switch upstream valve 3 0=OFF / 1=ON
			Bit 3	Start self-calibration of the regulator
			Bit 8-15	Selection of the PID parameter set

ACCESSORIES

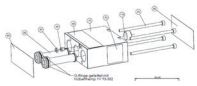
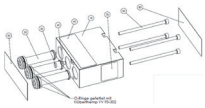
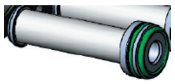
LasGAR basic

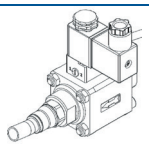
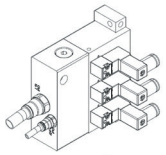
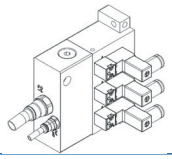
ACCESSORIES

	DESCRIPTION	ORDER NO.
	Connection block cpl. straight	PS14075
	Connection block cpl. side	PS14111
	Fastening set (bolt/cord packing)	PS14112
	Connection block with tecno for mirror adjustment	PS14113
	Fastening bolt proportional valve cylinder screw DIN 7984\M4X50-A2K	KY000579
	Device outlet EN 175301-803C\GSD-15 (upstream valve 2/3gas)	KB3569
	Device outlet EN 175301-803 Form B (upstream valve 1gas)	KY9393
	3/2-way solenoid valve \ N331.0B	KC4617
	Screw plug \ G 1/4 NBR	KX6215
	Screw plug \ G 3/8 NBR	KW0428
	Silencer short \ D1K-08	KW0705
	Protective cap \ M12X1, IP 67	KC9314
	Straight Screw-in connector \ D12 G3/8	KC9313
	Straight Screw-in connector \ D10 G3/8	KC9312
	Straight Screw-in connector \ D6 M5X0.8	KC9311
	Elbow union \ D10 G1/4	KC9307
	Plug \ D12	KC9310
	Plug \ D10	KC9309
	Plug \ D6	KC9308

ACCESSORIES
LasGAR basic

ACCESSORIES

	DESCRIPTION	ORDER NO.
	Cable plug \ M12-D, number of pins: 4, screened, sprayed onto the cable, length 2 m, cable PUR	KB3230
	Cable socket \ M12-A, number of pins: 8; overmolded and screened, length 5 m, cable PUR	KB3231
	Cable socket angled \ M12-A, number of pins: 8; overmolded and screened, length 5 m, cable PUR	KB3592
	Y-adapter cable 2-gas --> for switching the upstream valves via bus activation	PS14100
	Y-adapter cable 3-gas --> for switching the upstream valves via bus activation	PS14098
	Lasfil Compact Retrofit \ 2-gas (sw)	PS12732
	Lasfil Compact Retrofit \ 3-gas (sw)	PS12721
	Filter set for cutting gas inputs -> scope of delivery 1 filter cartridge with O-rings mounted and pre-greased with oxygen grease	PS12739
	Filter set for control air input ---> scope of delivery: 1 filter element, 1 O-ring	PS12740

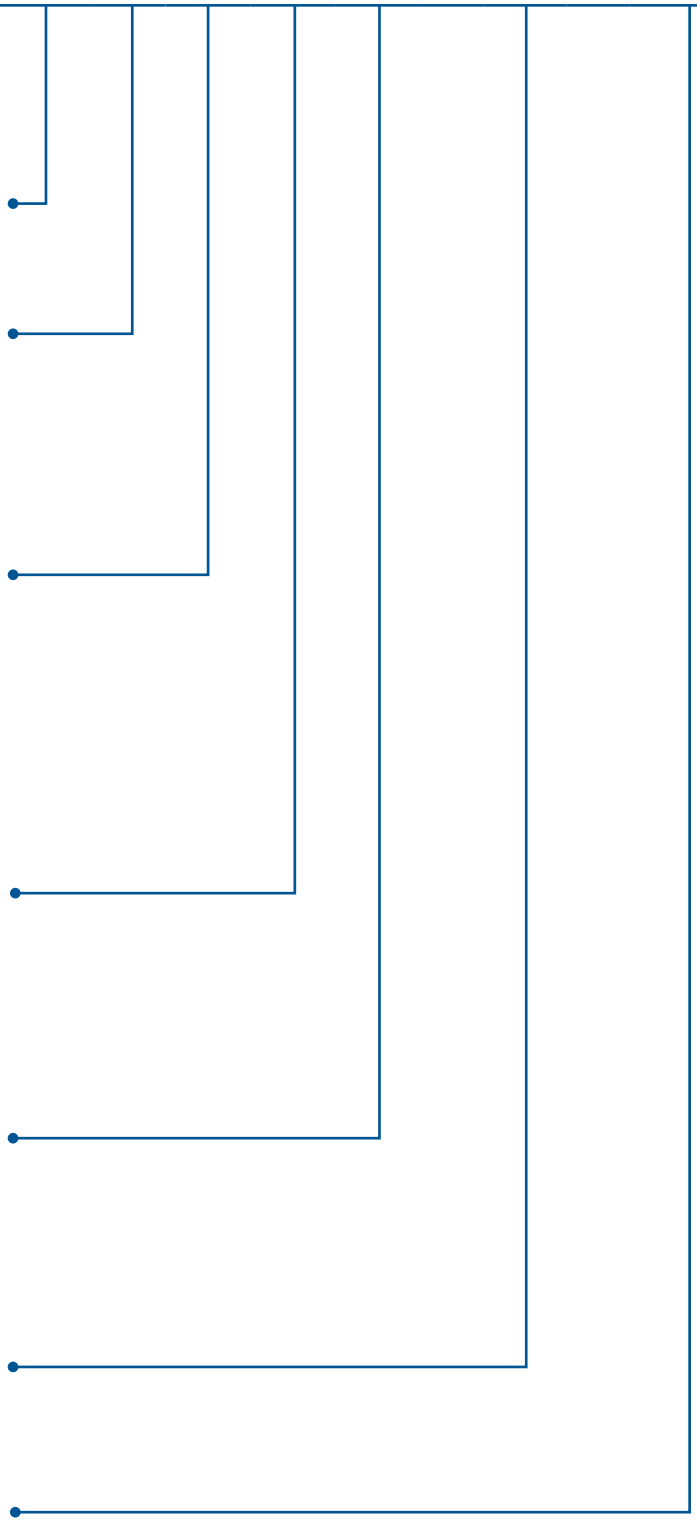
	Connection block 1-gas cpl. \ PRE-5	PS14075
	Connection block 2-gas cpl. \ PRE-5	PS14073
	Connection block 3-gas cpl. \ PRE-5	PS14079

ORDER KEY

LasGAR basic

EXAMPLE

ID NUMBER	PS14	5	3	0	2	–	555	–	002_



System description

PS14	Lasgar

Variant description

6	Basic
5	Basic with filter

Number of upstream valves combined

0	No valve
1	1 valve, installed
2	2 valve, installed
3	3 valve, installed
4	1 valve, separate (split)
5	2 valve, separate (split)
6	3 valve, separate (split)

Variant Target value/communication

0	Analog current 4 – 20 mA
1	Analog voltage 0 – 10 VDC
2	Digital EtherCAT
3	Digital Profinet CCB

Delivery accessories

0	No accessories
1	Quick-exhaust valve G3/8"
2	Connection plate

Special configuration

555	HOERBIGER Standard + Bluetooth
557	HOERBIGER Standard + Bluetooth + regulator turned 180°

Version info

A	Index A

CONVERSION FACTORS

LasGAR basic

CONVERSION FACTORS

VALUE	UNIT	CONVERSION UNIT	FACTOR
Length	mm	in	0.03934
	in	mm	25.4
	m	ft	3.28084
	ft	m	0.3048
Weight	kg	lb	2.204622
	lb	kg	0.453592
Pressure	bar	psi	14.5035
	psi	bar	0.06895
	MPa	psi	145.035
	psi	MPa	0.006895
	bar	MPa	0.1
	MPa	bar	10
Temperature	°C	°F	1.8 °C + 32
	°F	°C	0.5556 °F – 32
Torque	Nm	ft/lbs	0.7375
	ft/lbs	Nm	1.3558

ADDITIONAL DOCUMENTATION

LasGAR basic

WWW.HOERBIGER.COM

This data sheet and additional documentation is available in the download area of the company's website.

www.hoerbiger.com

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www.hoerbiger.com

HOERBIGER
because performance counts